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For the President of the European Patent Office

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System for attaching accessories to a vehicle's bodywork using clips

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SYSTEM FOR ATTACHING ACCESSORIES TO A VEHICLE'S BODYWORK
USING CLIPS

5 The present invention relates to a system for attaching accessories to a vehicle's bodywork, and more specifically, to an attachment system using clips.

 The invention is especially applicable to the attachment of accessories which are located in the interior of the motor vehicle, on the modular roof of the same. For instance, the invention is applicable to the attachment of sunshades, hooks, hangers, handles, spectacle holders, etc.

10 Systems for attaching accessories to a vehicle's bodywork by means of clips are known, that include elastically deformable arms which are inserted by applying pressure through openings made in the sheet of the vehicle's roof or bodywork, where they remain attached, keeping the accessory in question in place. These clips can be metallic, obtained, for instance, from sheet steel.

15 For this purpose, clips are known which provide two supports on the bodywork sheet, thereby providing good resistance to stresses applied in the same plane, but are deficient to stresses applied in directions outside of said plane. This circumstance renders this type of clip inadequate for attaching accessories that must withstand stresses in different directions applied in
20 different planes, as is the case of sunshades, handles, etc.

 Also known are clips of larger dimensions which provide three main supports. These clips are designed so that one of them alone will withstand stresses in different directions, such as stresses that a sunshade must withstand. However, they have two main limitations: on one hand, their designs
25 allow little flexibility, as they force the accessory axis to pass inevitably through the interior of the metallic clip. On the other hand, they are designs for clips with three large supports on the bodywork, which are inadequate for the attachment of accessories to bodywork sheet of low thickness, since in the working positions, at times, almost the entire couple of force of the accessory bears on
30 one of the supports, deforming the bodywork precisely because of the low thickness of the sheet. In this sense, it must be taken into account that an increasing demand for low thickness of bodywork sheet exists, due to savings in weight and cost, with the aforementioned problems being present particularly in the attachment of sunshades.

35 The object of the present invention is an accessory attachment system

which avoids the aforementioned drawbacks using clips that tolerate stresses and couples of forces in a manner which is almost non-directional, that is, similar for any direction of applied force in the different working positions of the accessory. This circumstance is especially relevant for sunshades of modular roofs.

-The clip used in the accessory attachment system of the invention presents, furthermore, the following advantages. It maximizes the resistance to stresses and couples of forces exerted on the accessories. This is achieved by maximizing the number of support positions or points between the clip, the bodywork and the accessory, as well as the surface area of such supports. This need is achieved for roof accessories of any size and, moreover, is valid for all existing bodywork sheet thickness.

-Minimization of the effort of clipping to the bodywork, especially when the bodywork openings are curved in shape, which is necessary for quasi non-directional attachment systems with multiple supports.

-The attachment system of the invention is compatible with small-sized accessories and with different shapes of the supports of said accessories to the bodywork. The system is applicable for any existing accessory size, with the stress and the couple of forces requirements.

-The attachment system of the invention allows the relative position between the accessories and the roof lining to be maintained during the manipulation of the modular roof until it is mounted to bodywork.

-During mounting, the system of the invention ensures the guidance of the clip to the accessory and of the modular roof to the vehicle's bodywork.

These and other advantages are achieved with the attachment system of the invention through the use of a clip with at least six supports and which is composed of a central base from which at least six elastically deformable arms extend radially, all of which are symmetrically positioned and are bent toward the same side with respect to the plane of the central base. The clip will preferably be metallic, made of sheet steel.

The clip's base has an opening in which a screw is threaded, by means of which the accessory is secured to the clip.

In turn, the arms have end formations which lean in opposing senses against the inner and outer surfaces of the bodywork sheet, around the mounting opening. The arms are positioned facing each other in pairs due to

the symmetry of the clip. Three of these arms, hereinafter referred to as "wings," lean on the outer surface of the sheet of the bodywork sheet, while the other three, hereinafter referred to as the "pillars," rest on the inner surface. This is, half of the arms lean on the bodywork sheet in one sense and the other half in the opposite sense. The two types of arm occupy mutually alternate positions.

In this way, a large number of supports are provided by the invention clip, which act in opposite senses on the bodywork sheet, in alternate positions, thus allowing stresses and couples of forces applied to the accessory from any direction and in any situation or working position of the same, to be withstood.

The clips with six supports which form part of the invention are screwed to the accessory without needing a nut or other additional pieces, for which purpose the perimeter of the opening of the clip's base has a somewhat truncated-cone shape, adapted to the thread of the screw.

The clip's central base is shaped in the form of a plate from whose perimeter the aforementioned arms project, with each two consecutive arms being separated by an intermediate incut whose outline comprises two curved end sections and one intermediate section at a tangent to the end sections, all of them placed in the same plane. In this manner complete independence is achieved between consecutive arms, which is useful in obtaining flexing of the arms during its clipping into the drilled opening in the bodywork, without there being resistance from the upper area of said arms at their base, in order to achieve a low-effort clipping.

The end formations of the wings, which rest on the exterior surface of the bodywork sheet, consist of a series of transverse folds, which make up a transverse channel opened outwards. When assembling the clip in the bodywork sheet opening said channel will grip the edge of the sheet, the upper side of said channel resting on the exterior surface of the sheet, while the bottom of said channel rests against the rim of the bodywork opening. The lower side of the channel passes in front of the sheet inclined downwards. The folds made in these wings allow the sheet to be gripped from the edge of the drilled openings, so that all the wings having these folds withstand all the stresses and couples of forces applied from any direction on the accessory, attached using the clip. In this way, even when said stresses and couples deflect the clip from the perpendicular to the bodywork plane, some of the wings will withstand the stresses and couples in the upper side of the channel, while

others are withstood by the lower side, thus avoiding any advance in the unbalance of the attachment system with the clips.

Moreover, an optimum orientation of the clip with respect to the accessory which is mounted on the vehicle is achieved, with the result that in its position in the vehicle, two of the mentioned wings will always be placed symmetrically with respect to the line of the stresses that the accessory mounted on the vehicle withstands, on the side of the tensile loads.

The aforementioned wings also have sides made up of inwardly rounded longitudinal bands, which facilitates clipping onto circular drilled openings, without touching any sharp edges.

As regards the end formations of the pillars which rest on the interior surface of the bodywork sheet, the surface which is oriented towards the interior of the vehicle consists in a first transverse elbow oriented outwards, approximately at a right angle, which defines an outer segment which, near its free side, has a second transverse elbow directed towards the plane of the base with an angle greater than 90° , which delimits an inclined segment intended to rest on the inner surface of the sheet of the bodywork, and which allows an additional three supports on the bodywork to be obtained, so that, along with the aforementioned wings, a clip having six supports is obtained. The end segment of the outer section allows the placing of an anti-rocking support system between the clip and the bodywork, without any need for additional connecting parts, while it allows couples of force applied on the accessories to be withstood. Furthermore, the outer segment allows the lining of the roof to remain fastened, as it is compressed between said section and the accessory.

These accessories have surfaces on which the part of the external section of the pillars, limited between the two aforementioned transverse elbows, externally lean; such surfaces being limited by projections between which said part of the outer section is located.

All the characteristics and benefits described, as well as others characteristic of the invention, will be better understood with the following description, made with reference to the accompanying drawings, in which an example of embodiment is shown by means of a non-limiting example.

In the drawings:

Figure 1 is an expanded perspective view of an accessory attached to a vehicle's bodywork according to the system of the invention.

Figure 2 is a perspective view of the clip used in the attachment system of figure 1.

Figure 3 is a schematic diametrical section of the accessory of figure 1 mounted on the vehicle's bodywork.

5 Figure 4 is a view similar to figure 1, in which the accessory consists of the sunshade securing base.

Figure 5 is a larger scale perspective view of the accessory presented in figure 4.

10 In figure 1, an expanded perspective view of the mounting of an accessory on the bodywork or modular roof of a vehicle is shown, according to the system of the invention. This attachment is carried out by clips which are generally referenced by the number 1, which, as is best appreciated in figure 2, have six arms, three of them identical to each other and reference by the number 2, called wings; and another three which are labeled by the number 3, called pillars, that are also identical to each other, but different to the wings 2.
15 Both types extend radially from a base 4 that has an opening 5, occupying symmetrical positions with respect to each other, the wings 2 alternating with the pillars 3, the wings and the pillars being bent toward the same side with respect to the plane of the base 4.

20 The clip 1, as shown in figure 1, is intended to be inserted by the use of pressure through the openings 5' made in the bodywork 6 or roof of the vehicle. Preferably, a press-formed structure 7 will be formed toward the interior of the cabin, in the area surrounding the openings 5', in order to achieve a flat and reinforced surround of the sheet. The lining 8 will be placed over the inner
25 surface of the bodywork 6 or roof, which will also have an opening 9 and a shaped formation 7' that fits with the shaped formation 7 of the bodywork.

The introduction of clip 1 through the opening 5' is achieved by an elastic deformation of the wings 2 and the pillars 3. The purpose of the drilled opening 5 of the clip 1 is to insert the screw 11 which holds the accessory 10 intended to
30 be attached to the roof. Preferably, the opening 5 is surrounded by an approximately truncated-cone surface, so that the perimeter of the opening 5 forms a spiral in space, the shape of this spiral being determined by the thread of the screw 11. This allows the attachment of the accessory to be carried out without further use of screws or other additional parts, thanks to the drilled
35 opening 5 and the shaping of its perimeter.

As can be better seen in figure 2, the base 4 of the clip 1 is formed in the shape of a plate, with an approximately hexagonal outline that is extended from each of the sides into the wings 2 and the pillars 3. Each consecutive wing 2 and pillar 3 remain separated by an incut 12, whose outline consists of two curved end sections 13 and an intermediate segment 14 at a tangent to the previous ones, all of which are placed in the same plane. The incuts 12 cause a narrowing at the base of the wings and pillars. With this construction, an independence between wings 2 and arms 3 is achieved, that facilitates the flexing of the wings 2 during clipping into the opening 5' of the bodywork, without resistance in the upper area of said wings in the incuts 12, thus achieving clipping with little effort.

As shown in figure 2, the wings 2 have shaped ends 15 that, as is best seen in figure 3, form a channel which will grip the edge or rim of the bodywork sheet when assembling the clip 1 into the opening 5' in said sheet. The upper side 16 of the channel will lean on the exterior surface of the sheet 6, while the lower side of this channel 17 passes along the interior of the sheet 6, inclined downwards. In turn, the bottom of the channel will rest against the edge of the border of the opening 5'. With this structure, the wings 2 withstand stress simultaneously for any type of load applied to the accessory 10. In this way, even when the accessory suffers significant stresses and/or couples of force and the clips 1 tilt with respect to the perpendicular towards the bodywork, wings 2 will withstand the loads on the upper side 16 of the channel, while others will withstand the loads on the lower side 17, the three wings mutually assisting in all situations.

The lower side 17 of the channel 15 furthermore serves to facilitate the disassembly of these clips with tweezers when they have been mounted in the bodywork.

As shown in figure 3, the wings 2 have a pronounced outwards inclination, while the pillars 3 run almost parallel to the screw 11. The main stresses and torques in the area of the folds or channel 15 against the sheet of the bodywork 6, in the surrounding of the drilled openings 5', are withstood by the wings 2. Furthermore, as shown in figure 2, they have opposing incuts 19, into their side edges, adjacent to the channel 15, which, along with the incuts 12 adjacent to the base, cause corresponding narrowings, between which said wings have longitudinal strips 21 which are curved inward, defining a rounded

outer contour, which facilitates the insertion of the clip in the opening 5' of the bodywork sheet.

In turn, the pillars 3 also have end formation consisting of a first transverse elbow, approximately at a right angle, directed outward, which
 5 determines an outer section 24 which has a second elbow 25 directed toward the plane of the base 4, with an angle greater than 90° , from which a segment 26 remains inclined upwards.

When assembling the clip in the drilled opening 5' of the bodywork sheet, the section 24 of these pillars is placed in front of the bodywork sheet 6, on
 10 which it rests by the end segment 26, all of which as shown in figure 3.

In this way, a clip with six supports is obtained, three of which, defined by the wings 2, rest on the exterior surface of the sheet 6, while the other three, defined by the pillars 3, do so on the interior surface of the sheet 6.

A high number of supports are obtained which act on the bodywork sheet
 15 in complementary senses and directions.

The supports on the interior surface of the sheet, defined by the segments 26 of the pillars 3, provide an anti-rocking mechanism between the clip and the bodywork, withstanding part of the stresses and couples of force applied to the accessory. These end segments, in fact, allow the operativeness
 20 of the clips for sheets of different thickness, since they will flex more or less according to the thickness of the sheet.

The mounting of the clip on to the openings 5' of the sheet of the bodywork is guided by the clip's general truncated cone shape, defined by the wings 2, along with the curved longitudinal strips 21 of said arms.

As shown in figure 1, the accessories 10 may include on their back
 25 surface supports 28 for the section 24 of the pillars 3 which are placed in front of the bodywork sheet 6. These supports 28 can, moreover, include projections 29 between which the section 24 of the pillars 3 can be positioned, preventing its displacement, facilitating the handling of the modular roof and the
 30 accessories in the vehicle's lifetime, assuring the relative position between clips and accessories and, thus guaranteeing maximum resistance to stresses and couples of force on said accessories.

In addition, as shown in figure 3, section 24 of the pillars 3 serves to
 35 fasten the lining 8 of the modular roof, which remains compressed between said section 24 and the flat surface of the accessory 10. In this way, the modular roof

can be manipulated without the accessory changing its relative position in relation to the lining of the roof, until it is mounted on the bodywork.

Figure 4 is a similar view to figure 1, in which a specific application of the mounting of a sunshade is shown, using the same references to indicate the same components or elements.

In figure 4 the accessory 10 is used for mounting a sunshade and its attachment to the bodywork sheet 6 is achieved by means of two clips with reference number 1, for which two openings 5 are formed in the bodywork sheet 6 and a press-formed structure 7 similar to that in figure 1 is placed around these openings. The sheet has an auxiliary opening 30 for mounting the sunshade joint.

Figure 5 shows a larger scale perspective view of the accessory 10 which will have two openings for passing of two screws 11 for attachment to the clips 1. Around these openings, the accessory 10 has projections or shaped formations that have surfaces 28 for supporting the section 24 of the pillars 3, along with the lateral projections 29 which ensure the relative positioning between the sections 24 of the clips and the accessories.

Due to the stresses that the sunshade can transmit, in the example of figures 4 and 5, two attachment clips have been used. However, a single clip may be sufficient for the attachment of other accessories.

In the case of figures 4 and 5, the accessories have areas of support 30 against the flat segments 31 of the sheet of the bodywork 6, which assist the clips to withstand stresses and couples applied on said accessories. This allows the bodywork sheet not to have to withstand all the stress in the proximity of the openings 5 when large stresses and couples are applied, thereby preventing their possible deformation and also possible deformations of the clips.

The shaped formations 7 made around the drilled opening or openings 5 will allow the sheet to have a greater resistance in the proximity of said drilled openings.

Optionally, if the requirements of the vehicle so allow, the attachment of the sunshade could be effected by a single clip instead of two, as described with reference to figures 4 and 5.

The clips used in the attachment system of the invention allow a robust system to be obtained for attaching accessories to the lining of the modular roof and of said roof to the bodywork, without requiring any further parts, with

exception of the screw 11.

The attachment system can be carried out with an optimized orientation of the clips with respect to the accessories of the modular roof and the assembly of both with respect to the bodywork, in such a way that the resistance to the couples of force and stresses in the working positions of the accessory is greatest. For this, the clip is placed so that two of the wings, referenced number 2, are symmetrically placed on either side with respect to the line of the stresses withstood by the accessory mounted in the vehicle, on the tensile load side. In the case of the sunshades, as described with reference to figures 4 and 5, this optimized orientation is characterized in that the axis of the sunshade can swivel between the two main positions of the sunshade in the vehicle (front position and side window position), this swiveling being approximately symmetrical and within the angle formed by the lines that connect the center of the central bodywork drilled opening 30, for the sunshade axle, and the centres of the drilled openings 5'.

In the embodiment of figures 4 and 5, the position of the clips 1 which attach the sunshade accessory 10 is characterized in that for each of the two end positions of the sunshade, one of the two clips works with two of the wings 2 on the side of the sunshade body, symmetrically placed with respect to the axis of the couple of force applied to the end of the sunshade. In this way, an attachment system with two arms is achieved that bears the main component of the couple applied to the accessory with the least effort; furthermore having the assistance of the third arm 2 and of the three supports provided by the other three pillars, referenced number 3, as well as the second clip of the sunshade that also withstands the resulting turning couples.

CLAIMS

1.- System for attaching accessories on a vehicles' bodyworks using clips (1) fitted with elastically deformable arms, which are inserted by pressure and are attached in openings (5') drilled in the sheet of the bodywork, which clips have a central base (4) and at least six elastically deformable arms (2-3) which extend radially from the perimeter of the central base in symmetrical positions, facing each other in pairs, and are bent toward a same side with respect to the plane of said central base (4); which base has an opening (5) in which a screw (11) is inserted, by means of which an accessory (10) is attached to the clip; characterized in that the arms have end formations which lean in opposite senses against the surfaces of the sheet of the bodywork (6) around the mounting opening (5'), half of them (2) on the outer surface and the other half (3) on the inner surface, with the two types of arms occupying alternate positions; the end formations of the arms (2) which lean on the exterior surface of the bodywork sheet consisting of a series of transverse folds which form an outer transverse channel (15) that grips the sheet (6); the upper side (16) of this channel being intended to lean against the outer surface of the sheet, while the base leans against the rim of the opening of said sheet and the lower side (17) of said channel passes in front of the bodywork, inclined downwards.

2.- System according to claim 1 characterized in that the consecutive arms (2-3) are separated by an incut (12) formed by two curved end sections and one intermediate section (14) of different radius, at a tangent to the end sections, all of them placed in the same plane.

3.- System according to claim 1 characterized in that the arms (2) that rest on the exterior surface of the sheet have a narrowing adjacent to the end formations, caused by opposing incuts (19) made in the side edges of said arms.

4.- System according to claim 1 characterized in that the arms (2) that rest on the exterior surface of the sheet have two longitudinal end strips (21) curved towards the axis of the clip, located between the narrowing delimited by the incuts (19) adjacent to the end folds and the narrowing defined between the incuts (12) which separate every two consecutive arms.

5.- System according to claim 1 characterized in that the end formations of the arms which rest on the inner surface of the sheet consist of a

first transverse elbow (23) oriented outwards with respect to the clip, approximately at a right angle and determining an outer segment (24) which near its free transverse edge has a second free transverse elbow (25) orientated towards the plane of the clip base, at an angle greater than 90°, which defines an inclined segment (26) intended to rest on the inner surface of the sheet.

6. System according to claims 1 and 5 characterized in that the accessories have surfaces (28) on which externally leans the section (24) of the end section that is limited between the two aforementioned transverse elbows (23-25) of the arms that rest on the inner surface of the sheet, which surfaces are limited by projections (29) between which said part of the end section is located.

7. System according to claim 6, characterized in that the roof lining (8) partially penetrates and remains compressed and fastened between the back surface of the accessory (10) and the section (24) of the arm (3) which rests on said accessory.

8. System according to claim 1, characterized in that the accessories (10) also have areas (30) next to the bodywork sheet which rest on said sheet when the accessory is subjected to stresses or couples of forces, assisting the clips to withstand said stresses and couples of forces.

9. System according to claim 1, characterized in that the opening (5) of the base (4) of the clip is surrounded by a surface which is approximately truncated-conical in shape, so that the outline of said opening describes a spiral whose shape is determined by the thread of the screw (11) used.

ABSTRACT

System for attaching accessories to the bodywork of vehicles by means
5 of clips (1) fitted with elastically deformable arms which are inserted by pressure
and are secured in openings (5') drilled in the bodywork sheet, which clips have
a central base (4) and have at least six arms (2-3). The arms have end
formations which rest in opposing senses against the surfaces of the bodywork
sheet (6) around the mounting openings (5'), half of them (2) on the exterior
10 surface and the other half (3) on the interior surface.

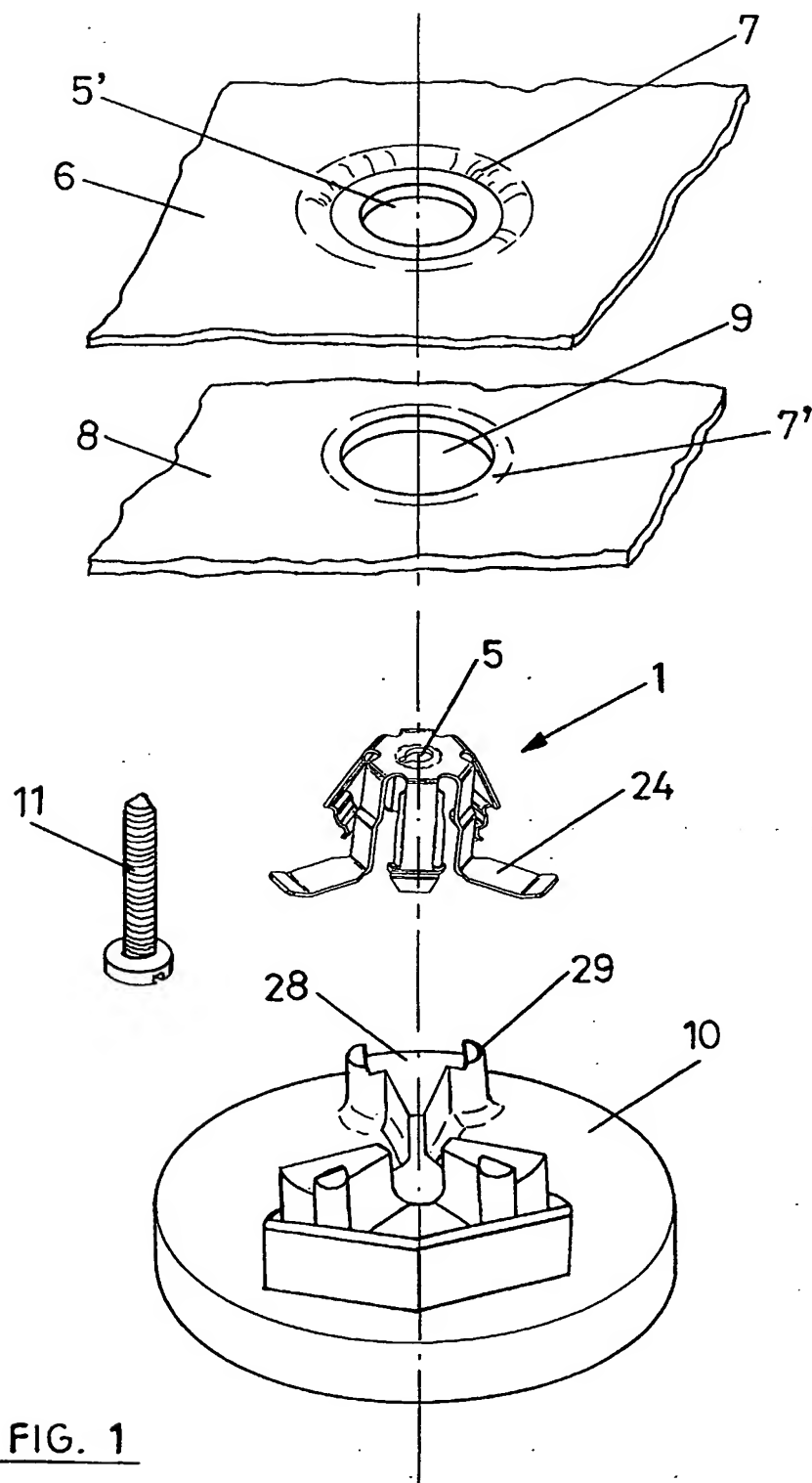
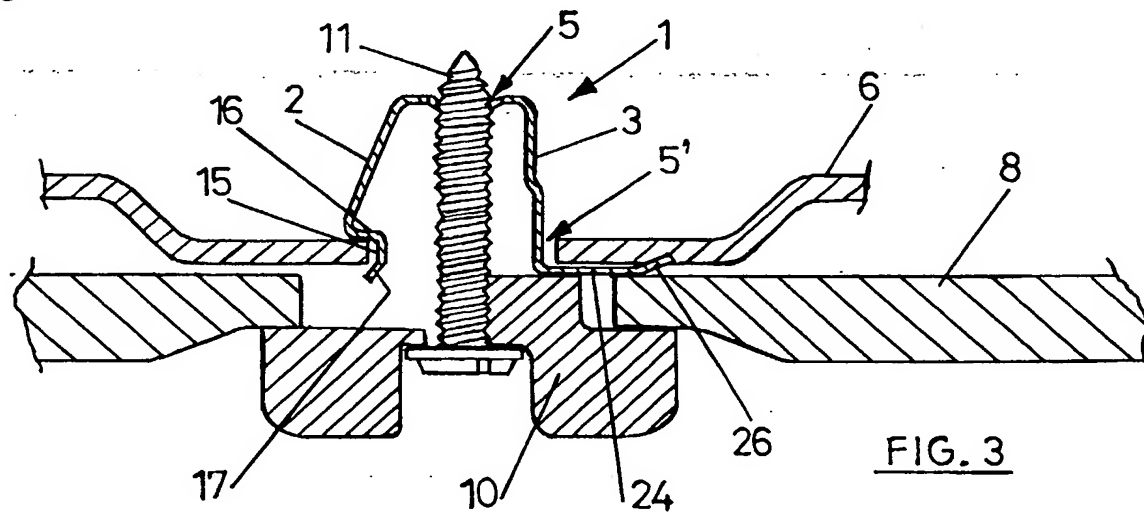
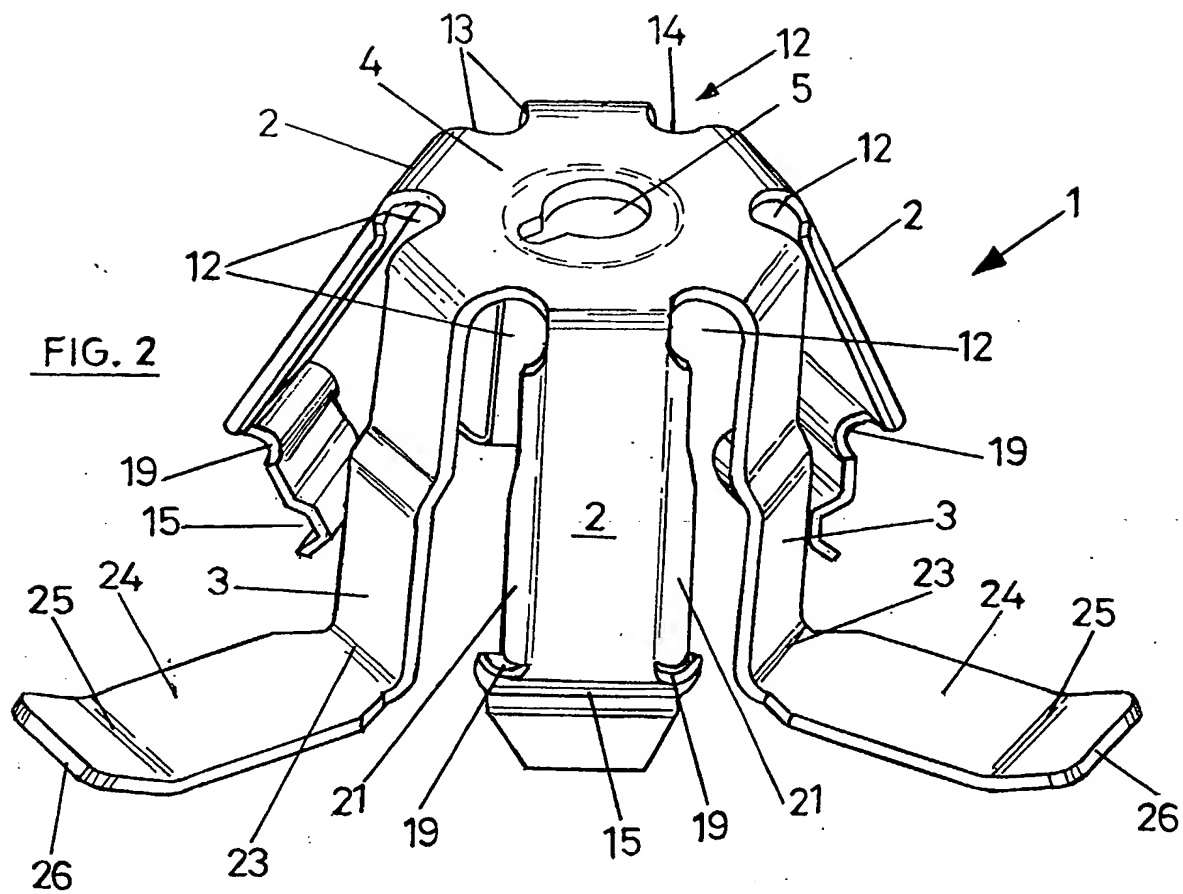


FIG. 1



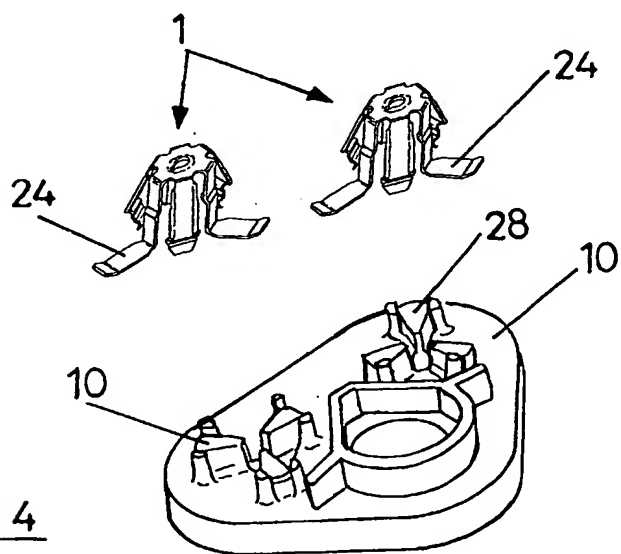
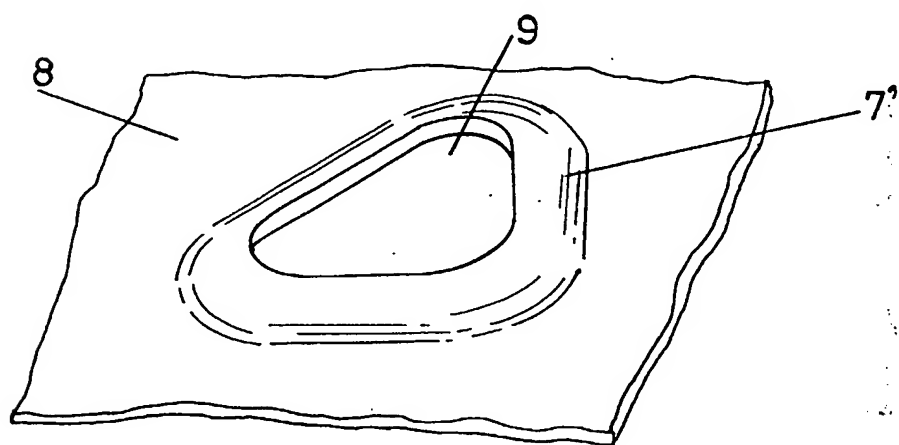
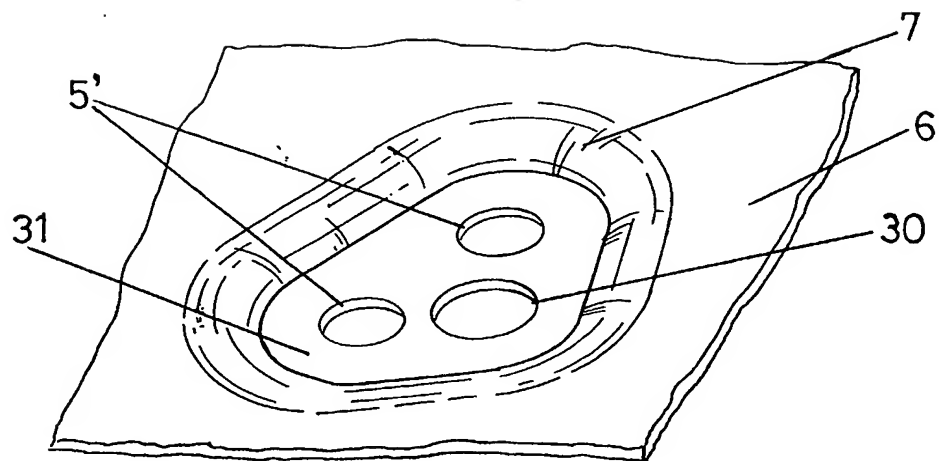


FIG. 4

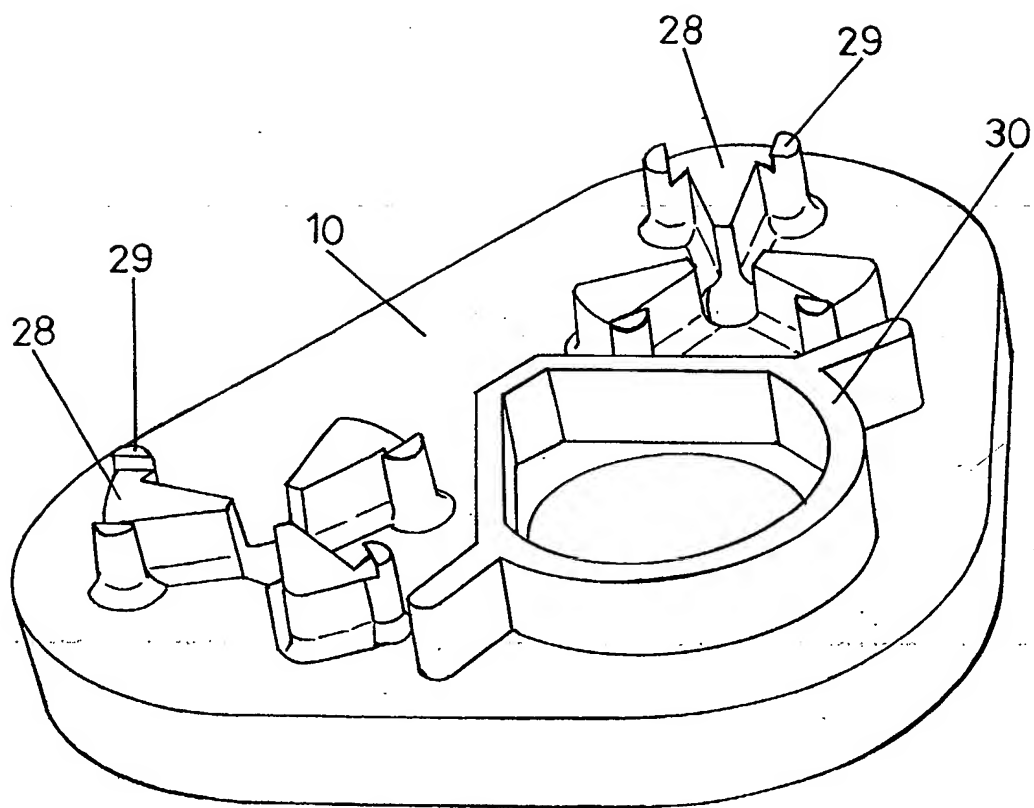


FIG. 5